Ideas for Including a Student with Quadriplegia into Physical Education

by Lauren Lieberman, Rebecca Lytle and George Irwin

Tim, nine years old, was born with a high level lesion at the cervical 3 (C3) level with no movement of his arms and limited neck control. He has a tracheotomy and uses a full-time nurse for assistance. Tim has normal cognitive and language development and successfully uses a wheelchair. Prior to his adoption at age five, he had no exposure to structured movement activity. In first grade, Tim was placed in a segregated physical education setting within an inclusive school. Tim is a very enthusiastic student and exhibits a willingness to try new activities and engage in social interactions. His physical education teacher wanted to teach and develop activities that would eventually allow Tim to be included in general physical education. According to Lytle (2000), “Physical activity is critical to the health and well being of every individual, and it is even more important for children with disabilities.”

Johnson, Kasser & Nichols (2002) also believe that all children should be included in standards-based physical education. But how can a child with a severe physical disability actively participate and be successful in a physical education program? Many students, professionals, and parents believe that a student with high-level quadriplegia cannot perform physical activities similar to their same age peers. These preconceptions can be dispelled through implementing functional activities. An encouraging attitude on the part of the physical educator can also help a disabled student improve his/her socialization skills. This article provides information that will be useful to physical educators in integrating severely disabled students into their physical education programs.

Physical conditioning, skill acquisition, game knowledge and social interaction are some of the benefits of physical education. Physical education for children with severe disabilities provides an opportunity for them to engage in activities that are sport and movement related. Children with severe disabilities obtain the same benefits from physical activity as their able-bodied peers. Movement is the goal, and can be defined, for example, as increasing range of motion in the shoulder or reaching to grasp a ball. Participation can enhance a student’s functional life skills by improving strength, range of motion and ability (Block, 2000). Physical education also provides a platform for children to experience diverse activities that may lead to future recreational opportunities, community participation and higher self-esteem.

Disabilities resulting from spinal cord injuries (SCI)

Injury to the spinal cord (SCI) may be caused by a variety of factors such as spina bifida, spinal tumors, or trauma from injury (National Spinal Cord Association, 1999). Congenital or acquired SCI severity depends on the location of the spinal injury. Quadriplegia, affecting all four limbs, often results when the injury is located between C-2 and C-4 of the cervical area of the spinal cord. Injured persons may have little or no use of their extremities and require mechanical and/or physical assistance for mobility. They may also have limited muscular strength in the neck and difficulty breathing. Secondary problems that may exist with SCI include bladder infections, difficulty regulating the temperature, and pressure sores. Individuals may also experience muscle spasms because muscles are no longer innervated as a result of the injury.
Assessment

In simple terms, an instructor assesses what a student can do, then records that information on an Individual Education Program (IEP). An IEP is a written document that describes the present level of performance, identifies goals and objectives for the near future, and specifies what services will be provided to meet those goals as stipulated under the Public Law 105-17, Individuals with Disabilities Education Act (IDEA), 1997. The IEP also monitors and evaluates the student’s progress. An IEP is required by IDEA (mandated for all students with disabilities by the U.S. government), and an IEP cannot be appropriately written without an assessment.

In order to acquire appropriate assessment information, a tool that is valid and reliable for the population being tested must be used. A popular criterion-referenced test is the Brockport Physical Fitness Test (BPFT) (Winnick & Short, 1999). The BPFT is appropriate for both the able-bodied as well as those with severe physical and mental disabilities since it allows for personalized testing.

An additional skill-based assessment is The Functional Skills Assessment (FSA) for High Level Quadriplegia. The FSA is a teacher-created authentic assessment tool used to evaluate current levels of performance during initial observations of the student (Table 1). Standardized and criterion-base assessments often serve no relevance for students with severe disabilities (Lieberman & Houston-Wilson, 2002). In this case, a teacher-created authentic assessment would be more valid. Tim’s level of performance was assessed using the FSA illustrated in the table. Following his assessment, instructional content was decided based on age-appropriate frameworks and standards for physical education and matching the components of the general physical education curriculum. One should note that the more individualized the program, the less frustration the student will experience (Auxter, Pyfer, Heuttg, 2001). Programs that are individualized decrease frustration because they are based on strengths and weaknesses of the student—challenging, but not overwhelming the student with activities that are not in their realm of ability.

Table 1: Functional Skills Assessment (FSA) for High Level Quadriplegia Physical Education

<table>
<thead>
<tr>
<th>Examiner: George A. Irwin</th>
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<tbody>
<tr>
<td>Place of Assessment: SUNY Brockport</td>
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<tr>
<td>Date of Assessment: September 22, 2002</td>
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<tr>
<td>Semester: Fall, 2001</td>
</tr>
<tr>
<td>Students Name: Tim Richards - Age: 9 - Sex: Male</td>
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<tr>
<td>Teacher / Aid: Nurse and Mother</td>
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<tr>
<td>Disability: Quadriplegia, C3 since birth</td>
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<tr>
<td>Scoring Key</td>
</tr>
<tr>
<td>Excellent = 4; Very good = 3; Good = 2; Needs work = 1</td>
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<tr>
<td>Total Possible Score: 60</td>
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<td>Total Score: 36</td>
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<tr>
<td>Flexibility</td>
</tr>
<tr>
<td>Lateral neck movement (60 degrees +) every time: 2</td>
</tr>
<tr>
<td>Head flexibility (chin to chest) every time: 2</td>
</tr>
<tr>
<td>Head extension (90 degrees, eyes to ceiling) every time: 2</td>
</tr>
<tr>
<td>Head rotation (rotate nose to right and left 180 degrees) every time: 1</td>
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<tr>
<td>Muscular Endurance</td>
</tr>
<tr>
<td>Can lift a 3- pound weight with his head and neck 15 times: 1</td>
</tr>
<tr>
<td>Can extend his head continuously at 90 degrees for 30 seconds while lying face down from a bench: 1</td>
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<tr>
<td>Cardiovascular</td>
</tr>
<tr>
<td>Ability to continue maximum inhale / exhale (minimum 30 sec): 3</td>
</tr>
<tr>
<td>Ability to sustain exhale (15 seconds): 2</td>
</tr>
<tr>
<td>Ability to exhale in short bursts (15 seconds): 2</td>
</tr>
<tr>
<td>Cognitive / Affective Domain</td>
</tr>
<tr>
<td>Eager to participate, always willing to try new activity one time per week: 4</td>
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<tr>
<td>Eager to socially interact by meeting new peers everyday: 4</td>
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<tr>
<td>Demonstrates responsible personal and social behavior in physical activity settings by waiting his turn, sharing equipment, and offering positive feedback to peers, everyday: 4</td>
</tr>
<tr>
<td>Demonstrates understanding and respect for differences among people in physical activity settings by not making fun of other peers, everyday: 4</td>
</tr>
<tr>
<td>Student will understand and be able to manage their personal and community resources by completing all homework assignments: 4</td>
</tr>
<tr>
<td>Findings:</td>
</tr>
<tr>
<td>Needs improvement on all aspects of physical fitness. Does very well with other students, and is very motivated.</td>
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</tbody>
</table>

Assessment tool created by George Irwin

Creating Activities for a Student with a Severe Physical Disability

IDEA defines physical education as the development of physical and motor fitness, fundamental motor skills and patterns, skills in aquatics, dance and individual or group games and sports. Developmental appropriateness should be considered when
Table 2: Golf Lesson Plan

**Focus of Lesson**
Golf putting, distance and speed relationships

**Student Performance Objectives:**
What should student be able to do as a result of lesson?
- TSW demonstrate golf putting by using an adapted plastic golf club and plastic ball in the gym
- TSW understand back swing and follow through

**Motor goal**
- Increased flexibility
- Fine motor control in reference to the subject’s disability classification
- Increased muscular endurance (pending the number of repetitions)
- Activity participation

**Description of Activity**
Place student in a prone position on a full-length scooter. Place golf club in students’ mouth. Place ball in reach of the golf club head. Student can rotate head to create back swing, make contact with the ball, and continue with follow through.

**Special Considerations**
Safety concerns - Be aware of muscle fatigue

**Golf Equipment adaptation**
- Plastic golf club using only 8-10 inches of the handle
- Flatten handle by melting with a heat source until it fits the mouth
- Apply liquid rubber over the mouthpiece
- Sterilize the mouthpiece
- Ensure golf club has an oversize head.
- Use a ping-pong ball or a Wiffle ball.
- Use flat surface, such as the gym floor
- Use a long scooter board

**Teaching Cues**
- Smooth back swing
- Contact the ball on the equator. (Associate the ball with a globe, the idea is to make contact on the equator)
- Follow through; continue past the point of contact

**Task 1**: Introduce the golf club to student. Explain how to hold it, the ideal point of golf ball and club contact point (equator of the ball contact at the center of the club face)

**Task 2**: Explain back swing and follow through. Putting: The distance of the back swing should be equal to the distance of the follow through

**Task 3**: Keep your head up; judge the speed in relation to the distance the ball must travel. Practice at different distances

**Task 4**: Putting for accuracy. Provide 5-15 trials with rest as needed

**Culminating Activity/Game: Obstacle Hole**
Set up obstacles student must hit the ball through to reach a final destination (the hole). No set stroke limit, (encourage to do in the least amount possible). Add and remove elements as needed

**Closure:**
Great job today everyone! How do we judge our follow through when putting?

How do we control the speed and distance of the ball when putting? What are the goals for next class? For homework look up and print out a page about Tiger Woods.
Table 3: Wheelchair Hockey/Soccer Lesson Plan

Motor Goal
- Increased use of head and neck muscles
- Fine motor control in reference to the subjects ability to maneuver the wheelchair
- Increased muscular endurance (pending the number of repetitions)
- Activity participation

Hockey Soccer Equipment Adaptation
- Use duct tape to attach a full size hockey stick to the preferred side of the wheelchair, (with the blade flush on the floor)
- Use a large orange (brightly colored) foam ball
- Place cones tall enough for student to see when the wheelchair is next to or close to them
- An oversized goal, (indoor soccer goal)
- Inclusion in small sided games with adaptations

Description of Activity
Duct tape sticks to the wheelchair and allow students to control ball by maneuvering the wheel chair. Start with soft taps and hard taps. Progress to controlling wheelchair speed in relation to the ball speed. Ball control with assistance from a peer tutor (to help keep ball in reach of student). Maneuver around and through cones

Examples of Adaptations
- Incorporate a peer tutor (Lieberman & Houston-Wilson, 2002)
- Use a boxed off area for student. When the ball enters that area student is allowed a certain number of seconds to pass to an unopposed team member (aided by peer tutor)
- No goalkeeper

Table 4: Water Polo Ping-Pong Lesson Plan

Focus of Lesson
Breathing control and assisted sport-related activity in the pool

Motor Goals
- Increased use of cardiovascular system
- Increased use of head and neck muscles
- Fine motor control in reference to the participant’s ability to control breathing
- Increased muscular endurance (pending the number of repetitions)

Description of Activity
Hold student above water with flotation device, facing away from instructor. Use the straw to blow ping-pong ball around the pool. Incorporate breath control (short bursts of air, or long deep breaths). Have student maneuver ball around pool. Challenge the student by playing a small-sided game, with peers, using a goal (blow ball into goal).

Special Considerations
What are the safety concerns? Tim needs to be supported 100% in the pool. He has a tracheotomy so has a suction device stationed at the closest area next to the pool.

Equipment Adaptation
2 foot straw or blowing devise, ping-pong balls

Aquatics allow students to experience buoyancy and increased freedom of movement. (Lepore, Gayle & Stevens, 1998). Water activities also offer opportunities for socialization, personal challenge, fitness enhancement, and enjoyment. Tim’s instructor wanted him to have experiences that would reverse stereotypes. “He will never be able to do that,” was the opinion often heard by teachers and family members. However, as Tim learned, with the right adaptations and support, he could participate in and enjoy activities that increased his physical fitness and his flexibility and muscular endurance improved with the continued use of his neck muscles. The games helped refine his wheelchair mobility, fine-motor control, and object-eye coordination, as well as social skills. Tim can now take part in wheelchair sports at home or with peers, further adding to his enjoyment and increasing his social skills.
members. Tim needed to exercise his neck more. By applying the principle of having fun and creating a challenge, Tim moved toward the exercises and activities that allowed him to play on his own at home or in a pool (Photo 3). Marco Polo, blowing bubble activities and games that required blowing and larger balls were a few of the activities. After six weeks of active participation, he developed deltoid function, some bicep movement and an ability to move his shoulders up and down—movements he did not know he had! Increased muscle function opened up new opportunities, so that Tim’s occupational therapist was able to order a mobile arm support. Tim’s mother exclaimed, “He can finally feed himself!”

Conclusion

Every child has a right to quality daily physical education in an appropriate setting. This setting means participating in developmentally appropriate activities with age appropriate peers. Through the games illustrated above, we have shown how a little creativity and collaboration can overcome preconceived barriers, and how students like Tim can gain some motor control of muscles. Students given the opportunity can become successful, participating member of a class through the cooperative efforts of both the adapted physical educator and general physical educator.

References


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